

ABSTRACT

A device and method for separating water into hydrogen and oxygen is disclosed. A first substantially gas impervious solid electron-conducting membrane for selectively passing protons or hydrogen is provided and spaced from a second substantially gas impervious solid electron-conducting membrane for selectively passing oxygen. When steam is passed between the two membranes at dissociation temperatures the hydrogen from the dissociation of steam selectively and continuously passes through the first membrane and oxygen selectively and continuously passes through the second membrane, thereby continuously driving the dissociation of steam producing hydrogen and oxygen. The oxygen is thereafter reacted with methane to produce syngas which optimally may be reacted in a water gas shift reaction to produce CO_2 and H_2 .